WHAT IS CLAIMED IS:

1. A wavelength division multiplexing (WDM) multiplexer, comprising:

a filter array including a plurality of filters, each filter having a disparate center frequency and an adjustable spectrum width operable to filter a mixed bandwidth channel; and

a combiner operable to combine into a wavelength division multiplexing (WDM) signal a plurality of mixed bandwidth channels passing through the filters of the filter array.

2. The WDM multiplexer of Claim 1, wherein the center frequencies of the filters are substantially equally spaced from each other.

3. A wavelength division multiplexing (WDM) demultiplexer, comprising:

a splitter operable to separate a wavelength division multiplexing (WDM) signal into a plurality of mixed bandwidth channels; and

a filter array including a plurality of filters, each filter having a disparate center frequency and an adjustable spectral bandwidth operable to filter a mixed bandwidth channel.

4. The WDM demultiplexer of Claim 3, wherein the center frequencies of the filters are substantially equally spaced from each other.

5. A wavelength division multiplexing (WDM) multiplexer, comprising:

filter means for filtering a plurality of mixed bandwidth channels having disparate center frequencies; and

combiner means for combining into a wavelength division multiplexing (WDM) signal a plurality of the mixed bandwidth channels passing through the filter means.

6. The WDM multiplexer of Claim 5, wherein the filter means comprises a plurality of filters each comprising means for adjusting a spectrum width of the filter.

7. A wavelength division multiplexing (WDM) demultiplexer, comprising:

splitter means for separating a wavelength division multiplexing (WDM) signal into a plurality of mixed bandwidth channels having disparate center frequencies; and

filter means for filtering each of the mixed bandwidth channels.

8. The WDM demultiplexer of Claim 7, wherein the filter means comprises a plurality of filters each comprising means for adjusting spectrum width of the filter.

9. A wavelength division multiplexing (WDM) transmitter, comprising:

a plurality of optical transmitters;

a filter array including a plurality of filters, the filters each connectable to an associated optical transmitter and having a disparate center frequency and a spectrum width dynamically adjustable to correspond to a bandwidth of an optical signal generated by the associated optical transmitter; and

a combiner operable to combine into a wavelength division multiplexing (WDM) signal a plurality of the optical signals generated by the optical transmitters and passing through the filters of the filter array.

10. The WDM transmitter of Claim 9, wherein at least two of the optical transmitters comprise disparate rate modulators.

11. The WDM transmitter of Claim 9, wherein at least one of the optical transmitters is operable to modulate data for a mixed bandwidth channel.

12. The WDM transmitter of Claim 9, further comprising a cross-connect operable to connect at least a subset of the optical transmitters to at least a subset of the filters in the filter array.

13. The WDM transmitter of Claim 9, further comprising at least one transponder, the transponder operable to receive from a connected optical transmitter an optical signal having a center frequency, to generate a frequency adjusted optical signal having a disparate

center frequency and to provide the frequency adjusted optical signal to a connected filter of the filter array.

14. The WDM transmitter of Claim 9, further comprising a plurality of transponders, the transponders each connectable to an associated optical transmitter and operable to adjust a center frequency of a received optical signal to generate a frequency adjusted optical signal and to provide the frequency adjusted optical signal to a connected filter of the filter array.

15. The WDM transmitter of Claim 14, wherein each of the transponders is directly connected to the associated optical transmitter, further comprising a cross-connect operable to connect at least a subset of the transponders to at least a subset of the filters of the filter array.

16. The WDM transmitter of Claim 15, the cross-connect further operable to connect any one of the transponders to any one of the filters of the filter array.

17. The WDM transmitter of Claim 15, wherein each of the transponders comprises a bit-to-bit transponder operable to provide wavelength conversion for the received optical signal.

18. The WDM transmitter of Claim 17, wherein each of the transponders comprises selectable clock sources to match an incoming bit rate of the received optical signal.

19. The WDM transmitter of Claim 9, further comprising a controller comprising logic encoded in media, the controller operable to determine a bandwidth for a channel, to select and connect an optical transmitter and a filter for the channel and to dynamically adjust the spectrum width of the filter to correspond to the bandwidth of the channel.

20. The WDM transmitter of Claim 19, the controller further operable to select the optical transmitter based on the bandwidth of the channel.

21. The WDM transmitter of Claim 19, the controller further operable to deactivate filters neighboring the filter of the channel that are within the spectrum width of the channel.

22. An optical transponder for a wavelength division multiplexing (WDM) system, comprising:

an input port operable to receive an optical signal having a first center frequency;

a control clock, the control clock having a plurality of clock sources dynamically selectable to correspond to a bit rate of the optical signal, the optical transponder operable to adjust the optical signal at a rate of a selected clock source from the first center frequency to a disparate second center frequency; and

an output port operable to transmit the optical signal at the second center frequency for multiplexing into a wavelength division multiplexing (WDM) signal.

23. An optical transponder for a wavelength division multiplexing (WDM) system, comprising:

means for receiving an optical signal having a first center frequency;

means for selecting one of a clock source corresponding to a bit rate of the optical signal;

means for adjusting the optical signal at a rate of a selected clock source from the first center frequency to a disparate second center frequency; and

means for outputting the optical signal at the second center frequency for multiplexing into a wavelength division multiplexing (WDM) signal.

24. A method for provisioning an optical channel in a wavelength division multiplexing (WDM) system, comprising:

determining a spectrum width for a channel;

allocating to the channel a bandwidth of a group of base channels covering the spectrum width for the channel; and

adjusting a passband of a channel filter at a center frequency of the group of base channels to correspond to the spectrum width for the channel.

25. The method of Claim 24, further comprising:

receiving a bit rate for a data flow to be transported by the channel; and

determining the spectrum width for the channel based on the bit rate.

26. The method of Claim 24, further comprising deactivating a plurality of filters neighboring the channel filter and having a center frequency in the spectrum width for the channel.

27. The method of Claim 24, further comprising setting a transponder to convert an optical signal for the channel from an initial center frequency to the center frequency of the channel.

28. The method of Claim 27, further comprising setting a clock speed for the transponder to match a bit rate of the channel.

29. The method of Claim 27, further comprising connecting the transponder to the channel filter.

30. The method of Claim 24, wherein the channel filter comprises a transmission channel filter, further comprising adjusting a passband of a receiving channel filter at the center frequency of the group of base channels to correspond to the spectrum width for the channel.

31. A system for provisioning an optical channel in a wavelength division multiplexing (WDM) system, comprising:

means for determining a spectrum width for a channel;

means for allocating to the channel a bandwidth of a group of base channels covering the spectrum width for the channel; and

means for adjusting a passband of a channel filter at a center frequency of the group of base channels to correspond to the spectrum width for the channel.

32. The system of Claim 31, further comprising:

means for receiving a bit rate for a data flow to be transported by the channel; and

means for determining the spectrum width for the channel based on the bit rate.

33. The system of Claim 31, further comprising means for deactivating a plurality of filters having a center frequency in the spectrum width for the channel.

34. The system of Claim 31, further comprising means for setting a transponder to convert an optical signal for the channel from an initial center frequency to the center frequency of the channel.

35. The system of Claim 34, further comprising means for setting a clock speed for the transponder to match a bit rate of the channel.

36. The system of Claim 34, further comprising means for connecting the transponder to the channel filter.

37. The system of Claim 31, wherein the channel filter comprises a transmission channel filter, further comprising means for adjusting a passband of a receiving channel filter at the center frequency of the group of base channels to correspond to the spectrum width for the channel.

38. A means for provisioning an optical channel in a wavelength division multiplexing (WDM) system, comprising:

logic encoded in media; and

the logic operable to determine a spectrum width for a channel, to allocate to the channel a bandwidth of a group of base channels covering the spectrum width for the channel and to adjust a width of a channel filter at a center frequency of the group of base channels to correspond to the spectrum width for the channel.

39. The system of Claim 38, the logic further operable to receive a bit rate for a data flow to be transported by the channel and to determine the spectrum width for the channel based on the bit rate.

40. The system of Claim 38, the logic further operable to deactivate a plurality of filters having a center frequency in the spectrum width of the channel.

41. The system of Claim 38, the logic further operable to set a transponder to convert an optical signal for the channel from an initial center frequency to the center frequency of the channel.

42. The system of Claim 41, the logic further operable to set a clock speed for the transponder to match a bit rate of the channel.

43. The system of Claim 41, the logic further operable to connect the transponder to the channel filter.

44. The system of Claim 38, wherein the channel filter comprises a transmission channel filter, the logic further operable to adjust a passband of a receiving channel filter at the center frequency of the group of base channels to correspond to the spectrum width for the channel.

45. A method for provisioning an optical channel in a wavelength division multiplexing (WDM) system, comprising:

determining a spectrum width for a channel;

selecting a center frequency for the channel; and

adjusting a width of a filter at the center frequency based on the spectrum width for the channel.

46. A method for provisioning an optical channel in a wavelength division multiplexing (WDM) system, comprising:

determining a bit rate for a transport channel;

identifying an available group of base channels together comprising a bandwidth adequate to transport the bit rate for the channel;

allocating the base channels of the group to the transport channel;

selecting a filter for the channel; and

adjusting a passband of the filter to correspond to the bandwidth for the transport channel.